

Appeals from decisions of the Wyoming State Office, Bureau of Land Management, increasing the annual rental rate for noncompetitive oil and gas leases. W-69821 and W-84432.

Affirmed.

1. Oil and Gas Leases: Known Geologic Structure--Oil and Gas Leases: Rentals

BLM may properly require the holder of a noncompetitive oil and gas lease to pay an increased rental of \$2 per acre for the entire leasehold pursuant to 43 CFR 3103.2-2(d), where BLM determines during the lease term that any part of the lands included in the lease is within a known geologic structure.

2. Oil and Gas Leases: Known Geologic Structure

A BLM determination that land leased for oil and gas is within a known geologic structure will not be overturned where the evidence establishes that land within the lease is included within the limits of productive formations as determined by isopachs of several productive formations, well data, and other geologic information, and the lessee fails to present a preponderance of evidence to the contrary.

APPEARANCES: Celeste C. Grynberg, pro se; Lowell L. Madsen, Esq., Office of the Regional Solicitor, U.S. Department of the Interior, Denver, Colorado, for the Bureau of Land Management.

OPINION BY ADMINISTRATIVE JUDGE FRAZIER

Celeste C. Grynberg has appealed from decisions dated December 19 and 20, 1985, by the Wyoming State Office, Bureau of Land Management (BLM), increasing the annual rental rate for appellant's noncompetitive oil and gas leases, W-69821 and W-84432, from \$1 to \$2 per acre or fraction thereof. BLM increased the annual rental because "all or part of the lands" in appellant's leases had been determined to be within two undefined additions to the Salt Wells known geologic structure (KGS) designated effective July 12, 1984, and October 1, 1984.

Effective June 1, 1983, BLM issued lease W-84432 to appellant for 320 acres of land in Sweetwater County, Wyoming, described as sec. 31, NE[^], sec. 32, NW[^], T. 15 N., R. 102 W., sixth principal meridian. Part of the lands in lease W-84432 are within the undefined addition designated effective October 1, 1984. Appellant received lease W-69821 by assignment approved effective December 1, 1980. Lease W-69821 embraces 200 acres, also in Sweetwater County, described as sec. 4, E\SW[^], SW[^] SE[^], sec. 5, S\NE[^], T. 14 N., R. 102 W., sixth principal meridian. Part of the lands in lease W-69821 are within the addition designated effective July 12, 1984.

BLM's action of July 12, 1984, was based on its analysis of the geology of two fields in Sweetwater County, the Salt Wells Field and the Potter Mountain Field. BLM's action renamed and incorporated the "Potter Mountain KGS" as an undefined part of the Salt Wells KGS. Both leases at issue here are within the Potter Mountain Field. BLM's geologic report of that date states that production in the Salt Wells Field is primarily gas from the Dakota and Frontier Formations. Gas production in the Potter Mountain Field is from the Frontier, Baxter, and Rock Springs Formations. In both fields, hydrocarbon accumulation is caused by a combination of structural and stratigraphic traps. Effective October 4, 1984, BLM extended the KGS boundaries a second time, based on information gathered from a well drilled in July 1984.

BLM's decision to place these lands in the Salt Wells KGS was based on the well-established presence of the Frontier Formation and the Rock Springs Formation there. 1/ Also, BLM relied on the presence of the Dakota Formation to justify its second extension of the boundaries of the KGS:

The Frontier Formation is the most widespread and prolific gas producer in the Salt Wells area. The major producing interval consists of two continuous sand bodies separated by a highly variable thickness of shale in the upper portion of the formation, referred to as the "2nd Frontier". Usually, only one of the 2nd Frontier sands will produce, however, both sands do produce simultaneously in some wells. The 2nd Frontier sand interval can be identified from logs in every well that has penetrated the sequence in the Salt Wells area.

The Rock Springs Formation contains up to six separate sand intervals, all of which either produce gas or had a significant gas show locally across the structure (refer to Net Effective reservoir Isopach map for the Rock Springs Formation). The individual sands are discontinuous and cannot be traced laterally across the structure, except for the lower-most "F" sand. The "F" sand produces in wells in T.14N., R.102W., and had gas shows in

1/ BLM's Geologic Report of July 12, 1984, also refers to production in the Salt Wells KGS from the Baxter (Cretaceous) Formation, but BLM evidently did not rely on geologic data concerning this formation, as no isopach map for it was attached.

other wells in T.14N., R.101-102W. The "F" interval can be traced from well logs eastward from T.14N., R.102W. to T.14N., R.100 W., [including the land involved here.] [Emphasis supplied.]

(BLM Geologic Report, July 12, 1984).

Other wells in the area either produce or had shows from the Dakota Formation. * * * The Dakota contains at least three distinct sand intervals, all of which produce locally. In some instances, all three intervals are perforated during well completion, but it is more common for one interval to be selectively perforated and produced. The lowest-most sand interval is locally known as the "Lakota Formation", however, it is not differentiated in this report since it is not recognized by all operators in the area as a separate formation. The Dakota and intervals can be recognized, with minor stratigraphic variance, in every well that penetrated the sequence across the area. [Emphasis supplied.]

(BLM Geologic Report, Oct. 4, 1984).

BLM placed the boundary for the KGS "on the net effective zero-foot isopach lines calculated for the presumptively productive" formations, i.e., for the Frontier Rock Springs and Dakota Formations. 2/ Thus, BLM placed the boundary at the farthest-extending edge of these three formations. Portions of both leases lie within the boundary of the Salt Wells KGS as extended by BLM.

In her statements of reasons (SOR), appellant asserts that her lease acreages are some distance from gas production, which is limited to within three-fourths mile of a "structural axis" that she believes proceeds in a southeasterly direction from sec. 1 T, 14 N., R. 103 W., through secs. 7, 8, 9, 10, 11, and 13 to sec. 18 in T. 14 N., R. 102 W. With her statement of reasons, appellant attached a map of the Potter Mountain Field on which she locates five Frontier gas wells and two Rock Springs gas wells in close proximity to the structural axis of the field where she maintains gas production has been confined. She notes that portions of her lease W-69821 are within a mile of the axis, and that the acreage of lease W-84432 is up

2/ According to BLM's Geologic Reports,

"[t]he net effective reservoir thickness was calculated for each well in the Salt Wells area by using any one, or multiple combinations of the following: reports of operation, completion reports, production tests, drill stem tests * * *, IWR's, well logs (electric/induction logs, sonic logs, nuclear/density logs, temperature logs, and other miscellaneous logs as available), P.I. data, and other published and unpublished literature." BLM included isopach maps depicting the thickness of the Frontier, Rock Springs, and Dakota Formations along with its geologic reports.

to 2 miles from the axis. Appellant asserts that her parcels are separated from the axis by "dry holes," and that there are "dry holes" in close proximity to them.

As its answer, BLM submitted a February 14, 1986, memorandum from the Rock Springs District Manager (DM), responding to appellant's contention. Although BLM acknowledged that "historic gas production has been confined to the axis," it noted that "the hydrocarbon trapping mechanism in this area is a combination of structural and stratigraphic components," concluding that "[t]he limits of the stratigraphic trap are not necessarily confined to the axis of structure." BLM also disputed appellant's determination that some wells in the area were dry holes.

In her second statement of reasons (SOR 2) responding to BLM's answer, appellant again stresses that gas production is found in an east-west direction along the axis and that farther north and south of it there are only dry holes. In BLM's answer to SOR 2, BLM submitted a second report dated April 14, 1986, in which BLM's geologist states that he did not ignore the structural axis in the Potter Mountain Field. He asserts, however, that if he had based his determination of KGS boundaries solely on the structural axis, he would have been ignoring geologic data that indicate the extent of the trap which extends well beyond the axis.

[1] BLM's action increasing the rental was taken pursuant to 43 CFR 3103.2-2(d), which requires that the lessee pay \$2 per acre for the entire leasehold when BLM has determined that any part of the lands described in

a noncompetitive oil and gas lease is within an addition to a KGS. It is well established that when BLM has determined that any part of the lands described in a noncompetitive oil and gas lease is within an addition to a KGS, the lessee is properly required by BLM to pay an increased annual rental of \$2 per acre of the entire leasehold pursuant to 43 CFR 3103.2-2(d). Lewis & Clark Exploration Co., 97 IBLA 171 (1987). Appellant does not challenge this regulatory requirement, but contends that BLM should not have included her leases within undefined additions to the Salt Wells KGS.

A KGS is defined as "technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumptively productive." 43 CFR 3100.0-5(1). A KGS designation recognizes the existence of a continuous entrapping structure on some part of which there is production. Lloyd Chemical Sales, Inc., 82 IBLA 182 (1984). Accordingly, it is not necessary that there be production within or in the immediate vicinity of land designated as part of the KGS, as long as the land is determined to be "presumptively productive" on the basis of geologic evidence of the existence of a productive structure underlying the land. R. K. O'Connell, 85 IBLA 29 (1985). The lands added to the Salt Wells KGS are underlain by formations that have been shown to be gas bearing, so that these lands were properly determined to be presumptively productive.

The initial boundaries of a KGS are not preclusive of the possibility of future changes. They are defined for administrative purposes and cannot be taken as absolutely and accurately showing the extent of the geological structure producing oil or gas. Robert G. Lynn, 61 IBLA 153 (1982). Thus, BLM did not err in drawing its KGS boundary to include more than the immediate area of the structural axis.

[2] An appellant challenging a Departmental determination that land is within a KGS of a producing oil or gas field has the burden of showing that the determination is in error by a preponderance of the evidence. Bender v. Clark, 744 F.2d 1424 (10th Cir. 1984); Lewis & Clark Exploration Co., *supra*. When BLM places land within a KGS it must merely establish that a producing structure exists which extends to the land in question. By establishing this fact, BLM necessarily establishes that the land is presumptively productive. An appellant challenging such a determination must either show that the producing structure does not underlie the land, or affirmatively establish, as a fact, that the land is not productive from the structure in question. Thunderbird Oil Co., 91 IBLA 195, 202 (1986).

Appellant asserts that there are seven dry holes near her leases which are therefore "well beyond the productive limits of the KGS." The DM responds that the wells referred to as dry holes are actually incompletely tested wells. One of these, the British-American Oil E-1 Govt Ramey did not penetrate either the Frontier or the Dakota Formations; therefore, nothing is known about the potential of the formation at this location. Drill stem test (DST) No. 2 on this well encountered a medium blow, but there is no indication of gas recovery. However, well logs indicate that the tested interval (the Rock Springs Formation) "is probably gas-bearing."

In SOR 2, appellant speculates that the blow on this well was probably a discharge of air. Appellant notes that the flow pressures and shut-in pressures were "zero pounds indicating that the tested formation was incapable of giving up fluid." For these reasons, appellant states she does not understand how BLM could conclude that this zone is "probably gas-bearing."

BLM's geologist replies that the Net Effective Reservoir Isopach Map for the Rock Springs Formation shows that the well at issue is very near the margin of the reservoir, and only 4 feet of potential Rock Springs net effective reservoir were identified in this well. Despite this well's failure to gain production from the Rock Springs Formation, BLM's geologist maintains that "the 4-foot zone is apparently gas-bearing and probably contributes to the reservoir being productive at other locations," although it may not be capable of commercial production by itself. His report continues:

The reservoir identified on the logs is a thin zone at the top of a 25 foot thick sand, the remainder of which appears to be wet. As the appellant indicates, the 90-foot DST encompassing this zone is not a favorable test. There could be a number of causes for this, not the least of which could be formation permeability damage from the drilling mud. Certainly, the sustained "blow" indicates that something was entering the well

bore during the test (Attachment 2). This is not entirely consistent with the appellant's assertion that the formation is "incapable of giving up fluids."

(Geologist's Report (Apr. 14, 1986)).

The DM concedes that three wells in the vicinity of the leases are dry holes. He then summarizes the data on the Chambers 2-11 well in sec. 11, T. 14 N., R. 102 W., which "is currently producing gas from the Frontier Formation." BLM's isopach of the Frontier Formation cuts through a portion of lease W-69821 in sec. 4, T. 14 N., R. 102 W. BLM's geologist states that the "productive Frontier wells located a short distance south of the [British-American Oil E-1 Govt. Ramey Well] clearly demonstrate that a Frontier reservoir exists in the area" though its precise extent is a matter of interpretation.

There is no question that the expanded KGS area has several dry holes, although BLM has provided sufficient evidence to suggest that some of them might have been mischaracterized as such. In any event, the presence of dry holes, by themselves, does not mean that the overall area is not presumptively productive of oil and gas where the majority of the area is underlain by a producing formation. This is because, given varying geologic conditions such as porosity, there are inevitably instances where no production is found. See Beard Oil Co., 99 IBLA 40, 45-6 (1987); Angelina Holly Corp., 70 IBLA 294 (1983), aff'd, Angelina Holly Corp. v. Clark, 587 F. Supp. 1152 (D.D.C. 1984); Robert L. Lyon, 66 IBLA 141 (1982).

By means of a cross section, (Attached Fig. 1; Feb. 14, 1986, report at 2) the DM discusses a correlation between the Chambers 2-11 well and the Chandler No. 1 well in sec. 30, T. 15 N., R. 102 W. The cross section skirts lease W-69821 on the northeast corner and passes through the center of lease W-84432. According to the DM, the correlation shows that Dakota "A" and "B" sands exist in both wells. Also, the DM maintains that the well logs show a slight potential for gas in the Frontier Formation and a much higher potential in the Dakota Formation, and that, studied closely, the logs show that the Dakota "A" sand is probably gas-bearing, while the "B" sand is probably water saturated.

In her SOR 2, appellant contends that the "A" and "B" sands do not exist between the wells under discussion. In response, BLM's geologist states in the April 4, 1986, report at page 2, that the Dakota reservoir is less extensive than the Frontier reservoir, but as shown by the Chambers 2-11 well, it is productive in this area of the KGS. The geologist notes that appellant employed a different correlation than did BLM. He assesses the Dakota formation as being thicker in the Chandler than in the Chambers well and states that a variation in thickness creates some confusion in the correlation. He analyzes the cross section in part as follows:

Zone A in Figure 4 [isopach map] is the Dakota sand that I consider to be presumptively productive. According to my correlation, Zone "C" from the Chandler No. 1 Well, as shown in appellant's cross-section (Figure 5), is equivalent to Zone "A"

in the Chambers 2-11 Well. Appellant states that this zone (using our correlation) has seven percent porosity in the 2-11 well and eight percent porosity in the Chandler well. This appears to be correct from the data. It should be noted that within the Potter Mountain Field that reservoirs in the Rock Springs and the Frontier Formations produce with an average ten percent porosity (refer to Attachment 1). The log characteristics of Zone A in the Chandler well (Figure 4) would indicate that the sand is at least partially water saturated.

(Geologist's Report (Apr. 14, 1986) at 3).

In her filings throughout, appellant contends that there is insufficient geologic data to warrant combining the Potter Mountain and Salt Wells Fields. The DM in his February 14, 1986, report gives the following reasons for combining the fields:

1. Both fields are associated with the same geologic structure, known as the Salt Wells Anticline.
2. The hydrocarbon trapping mechanisms in both fields are similar; stratigraphic and structural. The limits of the stratigraphic trap appear to include both fields.
3. Both fields produce extensively from the Frontier Formation. Well log correlations of producing Frontier gas wells from both fields show that in many instances production is from the same sand interval, indicating a continuity of reservoir across the area. This reservoir continuity is also referred to in the "Geologic Report, Salt Wells KGS" [July 12, 1984].

Our review of the arguments and counterarguments persuades us that BLM's evaluation of the zone as presumptively productive is a reasonable one. Appellant's disagreement with it is based on an interpretation of the same data. Such a divergence in opinion is insufficient to demonstrate a showing of error in BLM's conclusion. See Kathleen M. Blake, 96 IBLA 61, 69 (1987). Moreover, the Secretary is entitled to rely on the reasoned opinion of his technical expert in the field, where such opinion is supported by competent evidence. Ralph E. Peterson, 94 IBLA 340 (1986); Thunderbird Oil Corp., *supra*.

BLM's geologic data establish that the leases at issue are included within the limits of productive formations as determined by net effective isopachs crossing the lands in the leases. BLM's conclusion that the lands are presumptively productive is based on a detailed and reasonable analysis of the sand intervals within the formations. As is conceded by BLM, its data is subject to interpretation. It is also subject to modification, pending the accumulation of newer information. While appellant offers geologic interpretations differing from those of BLM, she has not shown that BLM's isopachs are in error, or that the lands are not productive from the formations in question. Accordingly, appellant has not proved by a preponderance of the evidence that BLM's determination is in error.

Therefore, pursuant to the authority delegated to the Board of Land Appeals by the Secretary of the Interior, 43 CFR 4.1, the decisions appealed from are affirmed.

Gail M. Frazier
Administrative Judge

I concur:

David L. Hughes
Administrative Judge